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FOOD SUPPLY AND POPULATION GROWTH IN SOUTHWEST CHINA, 1250-1850

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ABSTRACT

Between 1250 and 1850 the population of southwest China increased from three to twenty million people. In this paper I delineate two periods of population growth--a small one from 1250 to 1600 and a boom one from 1700 to 1850--and relate their spatial and temporal characteristics to agricultural production. My conclusions challenge the popular assumption that in China frontier populations grew because of improved agricultural techniques or increased arable land. In the southwest, between 1250 and 1600, population did double because of government investment in agriculture. But between 1700 and 1850, population quadrupled because of the development of local mining industry. In Qing China, as elsewhere in the early modern world, major increases in population were often a consequence of early industrialization.

FOOD SUPPLY AND POPULATION GROWTH IN SOUTHWEST CHINA, 1250-1850[1]

James Lee

Between 1250 and 1850 the population of China expanded from 100 to 450 million people. Today there is a rough consensus that this dramatic increase was tied to advances in food production (Ho 1959, Perkins 1969, and Cartier and Will 1971). China's population grew because three long term movements--intensification of agriculture production from the thirteenth century onwards the dissemination of New World food crops from the seventeenth century onwards and the constant expansion of cultivated land throughout this period--combined to broaden China's food base. Higher per capita yields, according to this "agrarian model" of population dynamics, moderated surges in China's death rate (Elvin 1973, Fei, Liu, and Chen 1979, and Myers 1980). In consequence, China's population grew.

Admittedly, a rise in population necessitates an increase in food production. But overall estimates and national trends conceal local variations. China's population developed along regional as well as national cycles (Skinner 1977). Moreover, in spite of Ping-ti Ho's pioneering efforts, China's historical population statistics are still imperfectly understood, especially

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at the local level (Ho 1959). Instead, our knowledge of regional population trends is often inferred from circumstantial evidence--the expansion of markets, patterns of land holding, and methods of agricultural production--which population movements are then invoked to account for. In this study on the population history of southwest China, from the Mongol conquest in 1253 to the Muslim rebellions in 1855, I have accordingly collected material from a variety of sources, several of which are new to the scholarly world. I have analyzed these data in detail and used them to test the "agrarian model" of population growth. Based on my findings, I have attempted first to provide a more accurate estimate of population in southwest China; second, to analyze its spatial and temporal characteristics; and, finally, to relate these characterlstics to the southwestern patterns of agricultural production.

MAP 1 HERE

Between 1250 and 1850 the southwest evolved from a frontier backwater to one of eight macroregions that comprised China. At the same time the population of the southwest increased from 3 to 20 million. This rise in population can be divided into two periods, separated by the Ming-Qing transition (1596-1681). Between 1250 and 1600 the population of the southwest about doubled from 3 to 5 million. Between 1700 and 1850 the population of the southwest quadrupled from 5 to 20 million. According to my findings, while the "agrarian model" is directly relevant to the gradual rise in population during the three hundred fifty years before 1600, food production alone cannot explain the rapid rise in population during the century and a half from 1700 onwards. In the second part of this paper, I accordingly suggest an additional explanation which I call a "nascent capitalist" model of population growth.

Agrarian Expansion and Population Growth: XIII-XVI Centuries

We will never know exactly how many people lived in the southwest before 1250. No population returns survive from the Nanzhao (762-973) or Dali (973-1253) kingdoms. The eighth through twelfth centuries are a demographic blank. Nevertheless, from what little evidence is available, before and afterwards, we can draw a tentative picture of a stable native population totalling around 3 million. In 140 the registered population of southwest China was 2,898,817 people.[2] In 1304, over one millenium later, the registered population was still much the same. The Yuan generals who conquered the southwest reported a population of 1,287,733 people in Yunnan and 300,000 households in Guizhou.[3] Even these figures may be high.[4] According to the Yuan generals, most of the southwest was "deserted and sparsely populated."[5] Only the regions centered around the Erhai and Dian lakes in Yunnan were densely settled. In the late thirteenth century, when Marco Polo visited the capital of the former Dali kingdom at Dali, he marvelled at its large urban population (Yule 1876, p. 52).

MAP 2 HERE

Southwestern population did not begin to grow until the thirteenth century when, for strategic reasons, the Chinese government began a sustained effort to settle and develop the southwest (Jiang 1957, Du 1979, Lee 1982b, and Fang 1981). Between the thirteenth and sixteenth centuries the imperial government moved over 1 million settlers from China's interior to the southwest. They organized them on farms called *tuntian* and equipped them with tools, seed, and draft animals. They invested heavily to clear and irrigate

the new land. By 1400 government migrants had cleared 1 million *mu* of land. By 1600 their descendants had cleared another 2 million *mu*. At least one-quarter of these new lands were irrigated. Through these two parallel upward movements, extension of the arable and improvement of agricultural technology, the southwest accommodated the immigrants. Population growth during this period was directly tied to changes in the agrarian economy.

How many people were there? Historians agree that the population of southwest China increased substantially from the fourteenth century onwards, but they have failed to measure this population with any precision or to analyze its pattern of settlement (Lombard-Salmons 1972, pp. 166-71). Yet, throughout the Ming period, sources on population become progressively more plentiful. Although there are almost no figures available for southern Sichuan, partial census enumerations for Yunnan begin from 1390. They multiply for Yunnan and Guizhou after 1500. The enumerations are fiscal quotas based on corvee associations called *lijia*. While they are far too imperfect to give us any detailed sense of regional trends, they provide a basis for a tentative estimate of the total population in the early sixteenth century. These data deserve much closer scrutiny than has been given them so far. I summarize them in Table 1, which begins from 1502. Earlier provincial figures are too incomplete for us to make any estimates at all.

TABLE 1 HERE

These population figures are vastly incomplete.[6] At least one-half of the population did not register. In theory, the *lijia* enumerations included all able-bodied adult males who owed government service and their wives and children; in actual fact, where these associations were organized, underregis-

tration appears to have been common, especially among women.[7] Many men avoided corvee duty. More people were exempt from registration. Military households, for example, were only included in the 1578 enumeration for Yunnan and the 1550 and 1597 enumerations for Guizhou (Table 1). Moreover, the Ming organized lijia only in areas they ruled directly. Semiautonomous native leaders ruled most of the southwest. They owed no corvee to the central government and did not register their population.[8] As a result, much of the native population registered during the Yuan were not included in the Ming enumerations. Careful examination of the administrative geography of the southwest allows us to estimate the proportions of the exempt territory. In Yunnan the area of native jurisdiction covered roughly one-third of the province. In Guizhou the native territory was more extensive still, at least one-half of the province. Even larger was the exempt area in southern Sichuan which comprised well over three-quarters of the region. If we increase our figures accordingly, we find that by the early sixteenth century the probable population in the southwest was over 2 million for Yunnan, perhaps 1.5 million for Guizhou and over half a million for southern Sichuan, or a total of 4 million people. This is only an estimate. We have no guarantee that the proportion of missing people was similar to the proportion of missing land. My calculations of cultivated acreage, however, suggest that this estimate is very plausible.[9] In any case this is the sole projection available for southwest China as a whole before the eighteenth century.

When and where did population increase? The provincial enumerations report tax quotas, not real population. Consequently aggregate totals almost never change at the provincial level. Although they do change at the prefectural level, these changes seem more fiscal then real.[10] Nevertheless, evidence from the county and commandary levels in Yunnan points to an increase in

population during the fifteenth and sixteenth centuries. All together, partial returns are available from four counties and commandaries in Yunnan Province: Tengyue Commandary along the Burmese border, Shibing Commandary near the southern Yunnan border, Anning County, a present-day resort town near Kunming, and Taihe County, now known as the city of Dali. I summarize these data in Table 2.

Table 2

The Rise of Registered Population in Yunnan, 15-17 Centuries

Year	Tengyue	Year	Shibing	Year	Taihe	Year	Anning
1464	2,540	1400	6,020	1522	54,782	1400	5,800
1502	7,020	1512	11,670	1576	52,824	1502	15,000
1512	9,742	1550	18,375	1622	96,734	1550	21,500
1532	10,326	1592	18,097				
1567	11,120						

Sources: Tengyue Tingzhi (1887 ed.), 3.1a; Shibing ZZ (1673 ed.), 4.1b; Taihe XZ (1752 ed.), 2.1a-3b; Anning XZ (1949 ed.), unpaginated.

The figures indicate that population was on the rise both in such frontier colonies as Tengyue and Shibing and in such metropolitan areas as Anning and Dali. But the rate and rhythm of growth vary significantly. Of course, these variations may be more indicative of changes in the fiscal levy than of actual population trends. Village lists, however, show the same discontinuities of growth. In Xundian, for example, northeast of Kunming, over half of the villages extant in the sixteenth century had been established after 1400.[11] By contrast, other areas, such as Zhaozhou, on the southern shore of the Erhai Lake, remained stagnant.[12] So far as we can tell, all the villages

there in the sixteenth century date from the fourteenth century. An active forward movement, in other words, swept through the southwest, but while it caught on in some areas, it ignored others.[13]

Inventories and descriptions of estates illustrate the abrupt contrasts of southwestern settlement. Typically these documents record holdings, rents, labor obligations, and sometimes the names of tenants and their families. Unfortunately, such sources are few and have only begun to be collected by the Chinese.[14] Consequently, these data have so far been little used.

Three illustrations from my own experience of what can be found in documents of this kind may encourage their collection and closer study. The general impression they convey is one of intermittent dense settlement and discontinuous population growth. In our first example, from a monastery estate on the western shores of Dian Lake, an estate inventory dated 1694 lists over 440 households grouped into nine villages in 1502, and 722 households in 1550--an average density per square kilometer of 456 inhabitants.[15] Again, the rise in population seems to have been uneven. While one village with 25 households remained stationary, another increased in two generations from 66 to 157 and another from 30 to 103. In Dali, our second example, the lands of a native chieftain appear to have been less closely settled.[16] According to an inventory of his estate, compiled in 1368-79 on the back of a Yuan sutra, 223 non-Han tenant households subsisted on some 400 shuang of land, resulting in an average density per square kilometer of over one hundred individuals (one southwestern shuang is equivalent to five Chinese mu, or seven-tenths of an English acre). Around Dali and Kunming, in other words, the population density was far higher than in Bafan. Even if these examples are valid only for patches of settlement separated by vast tracts of empty land, and even if, on that account, the average density of a region as a whole

was much lower, it still seems that land in the more advanced areas was heavily occupied.

Indeed, our third example shows that in at least one estate from Tonghai County in eastern Yunnan, land was occupied to the point of overcrowding. An estate inventory drawn up in 1376 from one village there presents a graphic picture of overpopulation.[17] Here the land was organized according to farming units called fen (literally, "share"). Although each of these units theoretically represented the land of one family, they appear to have actually been shared by several families. All together, 62 households lived on 24 shares of land, 45 were crowded onto 12 shares of land, and 17 families occupied 12 others. No more than seven shares of land supported two families each, and only five shares of land, one family each. Moreover, the names of the tenant families further suggest that the overpopulated land shares were occupied by a family head and his sons or by several married brothers. In short, pressure was exerted internally on the ancient household division of property. And yet, no new shares of land were created. Evidently, the excess population could not find anywhere to expand and so was condemned to overcrowding.

Agrarian Expansion: How do we explain this contrast? According to our evidence, although population in the southwest was on the rise, individual villages remained stationary. Old farming units were often overcrowded, but new units were not always created. Was this apparent discontinuity due to dislike of the solitary life of a settler or to a hostile environment and the limitations of techniques of food cultivation and tools?

Geographical studies of the southwest, and in particular the researches of Chinese historians which are still going on, provide a plausible answer: the combined restraints of primitive agricultural techniques did not allow the cultivation of inferior soils without large-scale capital investment. Meager

and discontinuous cultivable land restricted population growth outside the settled areas.[18] The present state of these researches suggests that agricultural technology in the southwest was far less sophisticated than in the rest of fourteenth-century China. Plows, for example, were too light to turn over the characteristically heavy soil, while plowshares were too blunt to dig adequately deep furrows. Irrigation, apparently, was confined to a few paddy fields on the shores of the Erhai and Dian lakes. According to historical records, draft animals were in such short supply that farmers had to harness wild cattle. Consequently, only light, easily worked soils, called jifentu (literally, "chicken-manure soil")--which could be dug without much effort, from which surface water drained readily, and on which the natural vegetation did not grow too thickly--were continuously cultivated and thus capable of supporting settlements. The fortunate areas where such soils predominated were probably able to support a rural population not much lower than in the eighteenth century. In contrast, heavy, sticky, and wet soils which required elaborate drainage were frequently left in their virgin state, and it is unlikely that many people dwelt on such lands. In the southwest the total cultivated land was very small and highly discontinuous. This arable accounted for less than 6 percent of the total area of the southwest and it lay scattered among twenty-five hundred mountain valleys. The predominant collodial, or clay soils, which surrounded the arable were almost wholly covered by meadows and woods. It is the low yields, due to primitive techniques, that account for the sparse numbers of people, just as it is the scarcity and discontinuous nature of the arable that caused the gaps in human settlement.

On the other hand, where new village enclaves were created by government settlers, such as those in Tengyue and Shibing, population growth was probably

faster and more sustained, a consequence of the vast resources of the Ming government. New villages were for the most part created by the government because considerably higher capital was required to recruit men, to move their households, to provide them with the essential equipment, and to feed and organize them to cultivate the predominantly clay soils. Population growth during the fifteenth and sixteenth centuries was therefore primarily concentrated in areas targeted by the government, namely the Dian and Erhai lake areas. Thus, agricultural expansion appears to have determined the spatial pattern and distribution of population growth. When the disorders of the Ming-Qing transition brought this expansion to a halt, population in the southwest ceased to grow.

Nascent Capitalism and Demographic Increase: XVIII-XIX Centuries

The southwest did not begin to recuperate from the devastations of the Ming-Qing transition until the defeat of the Rebellion of the Three Feudatories in 1681. When recovery set in, it was decisive. By 1700 the southwest had already recovered its sixteenth-century population of 4 to 5 million. By 1775 the population had more than doubled to 11 million. By 1850 it had doubled again to approximately 20 million. Within one and one-half centuries, therefore, the population of southwest China had increased fivefold, a rate of population growth surpassed during the Qing only by the Upper Yangzi region.[19]

How many people were there? The early history of this demographic recovery remains obscure. From the sixteenth century onwards population enumerations disappear throughout China, replaced by purely fiscal numbers ironically called rending (adult male).[20] Scattered census enumerations for individual counties and prefectures, however, reappear as early as 1685 and multiply

after 1700. These detailed data come from a new and far more comprehensive system of population registration, a national network of local security organizations called baojia (Wen Juntian 1935, Ho 1959, pp. 36-64, Cartier 1979). The early returns leave little doubt that a demographic upswing was underway. They are, however, too widely and irregularly spaced to show how long the process had been going on.[21] After 1740 evidence of sustained demographic growth become overwhelming for the entire southwest. I have been able to reconstruct a continuous series of population figures from 1741 to 1850 for Yunnan, and a partial series of population figures for Guizhou and southern Sichuan. In all three provinces, the numbers indicate that throughout the eighteenth century, population was growing unusually fast. Table 3 summarizes these provincial data for Yunnan and Guizhou. Table 4 summarizes comparable subprovincial data, mainly from the nineteenth century, for southern Sichuan.

TABLES 3 AND 4 HERE

These enumerations are incomplete and inconsistent, especially between 1740 and 1776. In theory, the Chinese government registered almost everyone in the southwest: men and women, adults and children, Han and non-Han, immigrants and natives, nuns and priests, beggars and coolies. But, in fact, the transition to such a universal system of registration was uneven and slow--a function of distance in a premodern world. At least half the southwestern population did not register. This explains why the population figures for Yunnan almost double between 1747 and 1748. There, the Chinese government at first registered only Han males.[22] They did not include Han women until 1748.[23] Nor did they make any formal effort to include the non-Han until

1756;[24] or to report the registered immigrant population before 1775.[25] Even afterwards, entire prefectures, such as Wuding, Jingdong, and Yongbei, continued to report fiscal numbers in place of actual population. Many other areas did not report at all, perhaps because they had not yet organized themselves into baojia.[26] Most importantly, all residents in the areas under native rule continued to be excluded from registration.[27] In 1766, according to Yang Ping, the governor of Yunnan, in 1766 twenty-one counties and commandaries (that is, over one-quarter of the seventy-five counties and commandaries in Yunnan) consequently did not report their population.[28] Underenumeration, in other words, was due to administrative procedure, not to any resistance to registration.[29] It was not until 1775, when the emperor reiterated his commitment to complete and accurate population returns and reorganized population registration accordingly, that provincial governments tried to include everyone in their registration. The registered population of Yunnan and Guizhou, therefore, jumped by over 2.5 million people between 1774 and 1776 (Table 3). In southern Sichuan the registered population increased from less than 100,000 in the mid-eighteenth century to well over 800,000 by 1796 (Table 4). Map 3 depicts the spatial distribution of the newly discovered population in Yunnan, the only province for which we have detailed information.

MAP 3 HERE

The remarkable increase, by half, in the aggregate registered population in the southwest attests to the dramatic expansion of population registration between 1774 and 1776. Even so, population figures remain very incomplete.[30] The population figures for Guizhou from 1776 to 1850, for example, are highly suspect since qualitative evidence suggests a far faster rate of

growth than the numbers indicate.[31] Although the data from Yunnan appear more consistent with the historical record, my analysis of the 1775 population survey of Yunnan, summarized in Table 5, for example, reveals that birth and death data were still greatly underenumerated.[32] According to contemporary observers, many individuals were registered under households other than their own.[33] Many more, especially immigrants, escaped registration completely.[34] The major sector of the population missing from our figures, however, were still the residents of land under native jurisdiction, all of whom continued to be exempt from population registration. As a result, even contemporary officials viewed the reported population numbers with suspicion--especially in areas with semiautonomous jurisdictions.[35] In the absence of the original household registers, we must, therefore, continue to use these population data with extreme caution.[36] Nevertheless, the data generated by the Qing enables us, for the first time, to answer with confidence some of the basic questions about southwestern population.

TABLE 5 AND FIGURE 1 HERE

Figure 1 charts the rise in the registered population of Yunnan and Guizhou from 1750 to 1850 as shown in Table 3. The numbers suggest that the upward movement of population started in Guizhou Province during the mid-seventeenth century, probably because the disorders of the Ming-Qing transition drove many refugees from Yunnan and Sichuan to Guizhou. By 1733 the registered population of Guizhou already exceeded six hundred thousand households, that is, perhaps 3 million people, four times the registered households in 1550 and double my estimated sixteenth-century population figure of 1.5 million people. After 1740, however, the center of demographic growth in the

southwest had returned to Yunnan. Indeed, the available government figures for salt consumption in Yunnan suggests that by the mid-eighteenth century the actual provincial population may well have been almost 3 million, that is, well over the registered population.[37] Still, the registered population of Yunnan did not surpass the registered population of Guizhou until around 1809. Both provinces continued to grow at a sustained pace throughout the nineteenth century. By 1850 they had a total registered population of 13 million. Since southern Sichuan had a registered population of over 2 million in 1850 this meant a total registered population for the southwest of 15 million.

But how many people escaped registration after 1775? We know that most of the missing people were Han and non-Han inhabitants of the semiautonomous, native lands. We know too that by 1825 the central government had counted over 1 million recent Han immigrants on these lands in Guizhou, southern Sichuan, and southeastern Yunnan.[38] I have estimated elsewhere that by the early nineteenth century at least five hundred thousand additional immigrants lived in northeastern Yunnan.[39] There must have been other uncounted immigrants elsewhere. Sales figures from the government salt monopoly, perhaps the best indirect indicator of actual population size in eighteenth- century China, provide estimates for the population of some prefectures (Dongchuan, Zhaotong, Yuanjiang, and Guangnan) that did not register their people.[40] Of course, not everybody bought salt from the government. We do not know, therefore, the overall proportions of the total missing population. The size of the non-Han population, in particular, eludes us. We know only that they outnumbered the Han population.

Administrative geography suggests that one quarter of the actual population in southwest China did not register. Due to the ongoing process of

administrative consolidation (gaitu guiliu), the area exempt from population registration had shrunk from its sixteenth-century extent (Lee 1982a). By the late eighteenth century the territory under semiautonomous jurisdiction in Yunnan had been reduced from one-half of the provincial area to one-quarter. In Guizhou the reduction was from two-thirds to one-third. Only in southern Sichuan did the exempt areas continue to occupy more than half the territory. In 1950 these areas contained approximately a quarter of the total population (Yunnan sheng xiongdi minzu renkou fenbu chubu tongji 1951). In the nineteenth century the proportions were probably much the same. If we assume that these ratios remained stable, we can calculate from the registered figures, emended by the data presented above, the actual population. According to my estimates, as of 1775 the real population of southwest China was at least 4 million for Yunnan, 6 million for Guizhou, and 1.5 million for southern Sichuan--a total population of 11 million people. By 1850 the population of the southwest had probably risen to 10 million for Yunnan, more than 7 million for Guizhou, and well over 3 million for southern Sichuan--a total population of at least 20 million. Since the registered population figures for Guizhou are greatly underenumerated, I would not be suprised if the total southwestern population was even larger. In other words, whereas the population took three hundred years to double in the period between the sixteenth and eighteenth centuries, it required less than one hundred years to double between the eighteenth and nineteenth centuries.

When and where did population increase? Our census enumerations are most complete for Yunnan Province.[41] There, because of the fortunate preservation of an annual series of provincial population figures from 1775 to 1850, we can trace part of the second phase of population growth with some precision (Table 3). There, too, because of the existence of partial series (1775-78, 1780-81, 1784-85, 1794-96, 1804-06, 1809-11, 1814-15, 1819-21, 1824-25, 1829-30) for seventeen of Yunnan's twenty-two prefectures, we can measure the range of local deviation from the aggregate average and map out the spatial framework of population growth in detail. These population figures include only the "native" population. They exclude the "aged" and "immigrant." Nevertheless, the provincial numbers are, to the best of my knowledge, the only annual series of such length for any province in China. The prefectural series are among the most detailed sub-provincial data available. As such, these figures are a precious source and deserve careful study. They enable us to glimpse the temporal and spatial characteristics of the rise in population far better than before.

TABLE 6 HERE

I have accordingly calculated the population densities for Yunnan by prefecture from 1775 to 1825. Prefectural areas were measured by their extent in 1820.[42] My results are summarized in Table 6. Based on these calculations, I have assigned the Kunming and Chengjiang Prefectures to the inner core, Dongchuan, Dali, and Menghua Prefectures to the outer core, Chuxiong, Guangnan, Kaihua, Linan, Qujing, and Wuding Prefectures to the near periphery, and Guangxi, Jingdong, Lijiang, Puer, Tengyue, Xunning, Yongbei, Yongning, and Yuanjiang Prefectures to the far periphery. The divisions are for heuristic purposes.

FIGURE 2 HERE

Figure 2 contrasts the annual rate of growth of Yunnan Province from 1775 to 1825, averaged over a period of five years, compared to the core and peripheral regions. All three growth curves illustrate the phenomenal increase in population at the turn of the eighteenth century. In 1775 Yunnan held a registered population of over 3 million people and was increasing at an average annual growth rate of approximately 7 per thousand, about the same as the national average. Then the population began to rise. By 1785 the annual growth rate had already risen to 10 per thousand, a very high rate of increase for a premodern society. A mere ten years later the rate had doubled to 20 per thousand, far higher than that of almost any other province in China. Although the rate of increase levelled abruptly shortly afterwards, the population of Yunnan nevertheless continued to grow at the remarkable pace of 20 per thousand with no substantial decrease until 1811. For half a century, 1775 to 1825, the registered population of Yunnan Province grew at an average annual rate of 14.6 per thousand, exactly double the 7.3 per thousand rate of increase in the registered population of China at large. Not until 1845 did population growth in Yunnan slow to an average annual rate consistently lower than the empire at large. These were astonishing decades for southwest China.

Unilke the previously localized patterns of population growth during the Ming, the rise in population during the Qing was universal (Tables 3 and 4). In Yunnan subprovincial population series display a rate of increase similar to the provinclal pattern. In almost all the prefectures, as in Yunnan at large, the rate of population growth rose in the late eighteenth century to a very high level. The range is from 15 to 30 per thousand. An increase in the number of villages lends further support to the view that this second very substantial rise in the population was universal throughout the southwest.[43] By the turn of the eighteenth century signs of a swelling population are

everywhere. The following series of maps of population density (people per square kilometer) depicts the spatial framework of population growth from 1775 to 1825 in ten-year intervals.

MAPS 4-8 HERE

Variation does, of course, occur. As we see from Figure 2, although the core prefectures, which accounted for almost half of the registered provincial population, grew parallei to the provincial population at large, the rate of growth was far faster. The only exception was between 1810 and 1811. In contrast, the population in the peripheral regions grew slower than in the core, but the peripheral growth rate peaked later than that of the core or the province at large. Moreover, although both the core and the periphery increased steadlly thoughout this perlod, the changes in the rates of increase are virtual mirror images of each other. When the rate of increase in the core areas accelerated (1775 to 1785), the rate of growth in the periphery slowed down. But when the rate of increase declined in the core (1785 to 1790, and from 1800 onwards), the growth rate in the periphery accelerated or remained stable. Not until after 1810, when the regional cycle was firmly on the down slope, did the rates of increase in the core and the periphery fall into step. In other words, population grew faster in the core areas as industry grew and cities swelled. But whenever the rate of growth declined in the core, more people moved to the periphery in search of land security.

Agrarian Expansion: How valid is the agrarian model? Was southwestern population growth merely the primordial response of an agrarian population to an increased food supply? Did southwestern population grow simply because a favorable man-to-land ratio in the seventeenth century attracted immigration

from China's overcrowded interior, or because the expansion of intensive agricultural techniques and the spread of new-world crops increased per acre yields? The available evidence suggests the answer to both questions is **no.** In southwest China population growth did not depend on increased agricultural production.

As we might expect, the rapid increase in population between 1700 and 1850 did coincide with a similar aggregate expansion of the food base. On the one hand, from 1700 onwards the Chinese adopted early ripening rice, increased the total paddy in the valleys, and moved to double and even triple cropping. On the other hand, from 1800 onwards, the Chinese expanded the mountain arable and replaced such traditional, low-yield, mountain food crops as barley, oats, and buckwheat with such high-yield, new-world crops as sweet potato, Irish potato, and maize (Ho 1978). Although historical land statistics are notoriously unreliable, we know that total acreage at least doubled during the eighteenth and nineteenth centuries.[44] There is also some evidence that per acre yields, as well as total yields, increased. These advances were largely a product of improvements in seed. Irrigation was far less important (Changjiang shuili shilue 1979, pp. 166-68). The long-term impact of new-world food plants seems especially important. Ping-ti Ho has emphasized their high yields and adaptable ecology (Ho 1959, pp. 101-35). I would add that they required less labor than other crops.[45] Today new-world food crops account for one-third of all food staples produced in the southwest (Yunnan diii gaikuang 1979, pp. 83-84). Mountain arable accounts for half of the total arable.

Yet it is clear that the chronology and spatial patterns of this agrarian expansion are unevenly correlated with population growth. Techniques of increased food production existed in the southwest well before the rise in

population in the eighteenth century. Early ripening rice can be dated in the southwest since the tenth century. According to Ping-ti Ho, most American food plants had arrived in southwest China as early as the mid-sixteenth century (Ho 1978). But these plants did not become a major food staple until the nineteenth century. As late as the eighteenth century several local southwestern histories classified corn as a "curiosity" or as a "fruit,"[46] while in many parts of Yunnan, where corn began in China, it remained a garden crop well into the nineteenth century.[47] Food tastes changed slowly. New technology did not release a population explosion. The Chinese only adopted new techniques of food production when population increased.

In contrast to Ming population growth, the expansion of population during the Qing was inversely correlated to the availability of land. Indeed, in Yunnan population increased fastest where land was least available. In 1775 Kunming and Chengjiang, the two inner core prefectures, had 863,000 people and over 2 million registered mu of cultivated land, that is, approximately one-quarter of the population and one-quarter the provincial acreage. By 1825 their share of the provincial population had increased to well over 2 million people, almost one-third of the registered population. Their proportion of the cultivated acreage, however, had shrunk to 1.6 million mu, less than one-sixth of the provincial acreage. By the early nineteenth century, in other words, each acre of cultivated land in the core on the average supported twice as many people as an acre of cultivated land in the periphery. These proportions have remained relatively stable ever since. Today these two prefectures hold almost one-fifth of the population, but only one-tenth of the cultivated land in Yunnan.

This proportion of people to cultivated land, or nutritional density, is a good index of the uneven burden imposed on the food supply by population

growth. Based on contemporary and historical statistics, I have calculated the extent of the arable in Yunnan by prefecture as of 1825.[48] The results are summarized in Map 9. According to my calculations, the average nutritional density in Yunnan in 1825 was 375 people per square kilometer of cultivated land. In one prefecture (Chengjiang Prefecture) the average nutritional density was as high as 900 people per square kilometer. In half of the province the nutritional density was well over 300 people per square kilometer. High nutritional density means either substantial production of food or a high level of food imports. If population growth was a direct consequence of increased agricultural production, then areas of high nutritional density should be areas of high per acre productivity.

MAP 9 HERE

In the southwest the major areas of increased food production, however, were in the periphery, not in the core. New-world food crops, for example, grew mainly in the peripheral mountain regions not on top of the flat core plateau. Corn and sweet potato were considered "mountain food." Only the non-Han and the mountain settlers ate them at first. Moreover, the new frontiers of intensive agriculture were such areas as present-day Baoshan Prefecture, along the far western border near Burma, and Qujing, on the far eastern border near Guizhou. Increased yields, in general, occurred where nutritional density was lowest.

In contrast, within the core the output of food per cultivated acre and per person decreased. On the one hand, from 1700 onwards an increasing number of core farmers preferred cash crops, such as tobacco and cotton, to food crops, such as rice. According to one eighteenth century observer, "Over half

the farmland near Kunming is planted with tobacco. More families sell tobacco than sell rice."[49] On the other hand, throughout the eighteenth and early nineteenth centuries a flood of nonagricultural immigrants moved to the southwest, attracted by the growth of urban trade and the booming mining industry in particular. Since, between 1700 and 1850, the core population increased over five times and the proportion of land planted in food crops simultaneously decreased by half, even if yields per acre doubled, per capita production of food in the nineteenth century would still have declined to one-fifth of what it had been in the eighteenth century. These areas of high nutritional density, in other words, had to depend on steadily increasing food imports to survive. From 1700 onwards a constant flow of grain from the periphery to the core was needed to feed the growing population.

An expanding network of grain markets, therefore, accompanied population growth.[50] As the population of the core regions grew, they extended their reach deep into the hinterland. By 1825 most of the grain consumed in Kunming, for example, was imported from Wuding Prefecture in the near periphery. By 1850 Kunming had to organize grain caravans from as far away as Tengyue Prefecture in the far periphery along the Burma border. The state organized much of this grain trade because the high costs of transport in the southwest made private traffic inefficient (W. Plow forthcoming). But the grain itself was grown on large, private, commercial farms often owned by immigrant merchants or native chiefs. According to most nineteenth-century officials, "State redistribution of grain was the most important service the government offered the people."[51] Although it is impossible to estimate how much grain was actually sold throughout the southwest, we do know that by the early nineteenth century the mining communities in Yunnan alone consumed over 80 thousand metric tons of grain per year, that is more than 800,000 shi.[52]

This remarkable expansion of food distribution and redistribution supported the growing number of people divorced from food production. Agricultural expansion, at least in the southwest, did not, therefore, determine the pattern and distribution of population growth. On the contrary, the increased production and circulation of food depended on early industry and urbanization and the markets they created.

Nascent Capitalism: if increased agricultural production cannot explain the rise in population during the Qing, as it did during the Ming, why did southwestern population explode between 1700 and 1850 from 5 to 20 million? A search for the why leads to the components of demographic increase. How much population growth was due to a net increase--from decreasing mortality or increasing fertility--and how much was due to net immigration?

My research suggests that the rise in southwestern population during the Qing was largely due to immigration (Lee 1982b). The increase in the proportion of people born out of province consequently parallels the growth in population. In 1700 the total immigrant population was only a few percent of the total population. Within 50 years their proportion had more than doubled to ten percent. By the mid-nineteenth century, one hundred years later, the aggregate immigrant population had doubled again to almost 20 percent of the 20 million people in the southwest, that is, 3 to 4 million people. Of course, earlier immigration had also boosted the population. But the Ming migrations were a product of government policy. In contrast, immigration from 1700 onwards was largely a response to the rising demand for labor, a product of the well-known expansion of the mining enterprises of the southwest. increased economic opportunity pulled large numbers of immigrants to the southwest. The southwestern frontier, in other words, attracted the labor force it could not produce.

Demographic expansion consequently altered the settlement and occupational distribution of the southwestern population. Before 1700 the southwestern population had been overwhelmingly rural and agrarian. The proportion of urban population was, at most, five percent. Nonagricultural labor was in such short supply that the Ming government drafted soldiers to work the Yunnan mines.[53] Within the next hundred years this picture changed profoundly. The appearance of a large number of miners is the best-known example (Sun 1967, 1968, 1971). According to Zhang Yunsui, the governor of Yunnan from 1732 to 1751, there were over three hundred thousand miners in the southwest in 1750. By 1800 the number of miners had increased to over five hundred thousand. Other immigrants filled other nonagricultural jobs. As a result, the total urban population at its height (ca. 1830) had increased to approximately ten percent of the whole population, more than double the proportions of the late sixteenth century. I estimate that the total nonagricultural workforce in the southwest by the early nineteenth century may well have been as large as 1.5 million, approximately twelve percent of the adult labor force. Through their concentration in the cities and their impact on the workplace, the new population transformed the southwest.

The rise of the mining industry has been identified with the "buds of capitalism" that began in late sixteenth-century China (Yan Zhongping 1957, Xia Xiangrong et al. 1980, Chen Lufan 1980, Wei Qingyuan 1891). The tragedy of the southwest lies in that by the turn of the eighteenth century most of the mines had already reached their peak. From the early nineteenth century onwards, mining output steadily declined. Economic expansion ground to a halt. After 1850 few immigrants moved to the southwest. Population growth accordingly slowed.

Conclusion

The rise of China's population from 150 million people in 1700 to 450 million people in 1850 remains one of the fundamental problems in Qing history. Most scholars have explained this acceleration in population growth in terms of increased food supply. According to their view, forces of production, especially soil and agricultural techniques, determined China's population growth. Since China's technology did not change in early modern times, neither did the rate of growth. From 1250 onwards Chinese population was, therefore, characterized by structural stability. The proportion of non-agricultural workers remained constant. One recent survey has called this model the "traditional" pattern of agrarian population dynamics (Fei 1979). Is his "agrarian" model correct?

The southwestern example challenges these presumptions. In southwest China, from 1700 to 1850, population increased largely because of expanded economic opportunities, not improved agricultural techniques or increased arable. Consequently the proportion of non-agricultural laborers changed radically from five to ten percent. Of course, the rise of southwest population from 5 million in 1700 to over 20 million in 1850 cannot sum up the experience of an entire subcontinent. The growth of China as a whole and the growth of its regional parts are logically distinct. Nevertheless, in the absence of other regional series as detailed in space and time, we have no reason to shrug off the experience of the southwest. There the rise of mines, cities, and trade attracted a flood of immigrants from China's interior and swelled the population. Increased immigration to the southwest may have created preconditions for economic growth (labor). Once started, this early urban, industrial population was far less vulnerable to Malthusian pressures upon food supply than those rural populations that preceded them. The rise of industry in the core was able to stimulate the expansion of food production in the periphery.

Table 1

Registered Population of Yunnan and Guizhou, 16-17 Centuries

Year	Yunnan households	Yunnan people	Guizhou households	Guizhou people
1502	126,874	1,410,094	43,354	264,798
1542	123,537	1,431,017	44,257	266,920
1550	133,958	1,433,110[a]	138,957	512,289[b]
1578	135,622	1,606,361[b]	43,405	290,072
1597	-	-	105,906	509,975[b]
1602	-	-	111,552	528,781[b]
1625	151,215	1,468,465	-	-

Sources: (arranged chronologically) 1502 and 1542: Zhou Guan (f. 1513), Houhu zhi (1578 ed.), 2.4b-5a, 6b, 9b, 12a-b, Peking NLB Rare Book Collection, microfilm 1146. 1550: Zhang Tianfu (f. 1547), Huangyu kao (1588 ed.), 1.21b-22. See also Zhang Huang (1527-1608), Tushu bian 42.3b. 1578: Yunnan TZ (1576/1934 ed.), 6.5. 1597: Guizhou TZ (1597 ed.), 1.11b. 1608: Qianji (1608 ed.), 19.10b. 1625: Dianzhi (1625 ed.), 6.5b.

[a] Zhang Huang (1527-1608), Tushu bian 42.3b also lists an additional "81,400 Han, native, and Mongol soldiers on active duty as well as their families." This means a total population well over 1,514,510.

[b] These numbers include the military households under the jurisdiction of the dusi, the Regional Military Commission as well as the civilian population under the jurisdiction of the buzhengsi, the Provincial Administration Office. The civilian population in Guizhou was 66,684 households and 254,420 people in 1555; 46,566 households and 325,374 people in 1597 and 51,212 households and 344,180 people in 1605. The civilian population in Yunnan was 135,560 households and 1,476,692 people in 1578. See MS 46.1171.

Table 3

Registered Population of Yunnan and Guizhou, 1733-1850

Year	Yunnan[a]	Guizhou[b]	Year	Yunnan[a]	Guizhou[c]	Year	Yunnan[a]	Guizhou[c]
1741	917,185	2,413,396	1778	3,149,261	5,060,552[b]	1816	5,811,139	5,328,072
1742	917,812	2,722,612	1779	3,174,339	5,072,198[b]	1817	5,873,543	5,339,701
1743	933,459	-	1780	3,201,222	5,081,167[b]	1818	5,938,787	-
1744	942,912	2,916,049	1781	3,230,044	5,094,576[b]	1819	6,008,824	5,347,439
1745	953,185	2,940,111	1782	3,259,383	5,102,635[b]	1820	6,067,171	5,351,541
1746	962,442	3,024,074	1783	3,294,147	5,110,760[b]	1821	6,131,668	5,354,038
1747	971,085	-	1784	3,328,875	5,116,129[b]	1822	6,194,557	5,356,745
1748	1,946,173	-	1785	3,367,170	5,146,896[b]	1823	6,255,753	5,359,740
1749	1,960,934	3,103,907	1786	3,413,163	5,150,880	1824	6,315,624	5,362,019
1750	1,967,837	3,134,107	1787	3,460,695	5,157,583	1825	6,349,680	-
1751	1,974,031	3,166,662	1789	3,564,815	5,170,070	1826	6,388,131	5,367,479
1752	1,980,631	-	1790	3,623,691	5,176,889	1827	6,427,095	5,369,129
1753	1,987,427	3,248,955	1791	3,689,434	5,182,754	1828	6,465,972	5,371,521
1754	1,994,198	3,273,343	1792	3,758,670	5,189,205[b]	1829	6,508,884	5,374,347
1755	2,000,772	3,301,692	1793	3,833,044	-	1830	6,553,108	5,377,146
1756	2,007,349	3,315,491	1794	3,913,474	5,206,063	1831	6,602,645	5,379,400
1757	2,014,483	-	1795	3,999,218	5,210,450	1832	6,653,925	5,381,710
1758	2,022,252	-	1796	4,088,252	-	1833	6,688,073	5,385,322
1759	2,030,369	3,381,821	1797	4,174,586	-	1834	6,730,264	5,388,166
1760	2,069,171	3,393,343	1798	4,264,835	-	1835	6,777,308	5,392,515
1761	2,078,802	-	1799	4,353,738	-	1836	6,825,580	5,396,378
1762	2,088,746	-	1800	4,455,309	-	1837	6,870,917	5,398,955
1763	2,099,417	3,417,865	1801	4,538,431	-	1838	6,916,330	5,341,372
1764	2,110,514	3,424,207	1802	4,632,974	-	1839	6,971,630	5,406,268
1765	2,125,597	3,430,086	1803	4,733,013	-	1840	7,018,621	5,410,035
1766	2,136,855	3,436,309	1804	4,833,894	-	1841	7,060,915	5,411,907
1767	2,148,597	3,441,656	1805	4,934,367	-	1842	7,105,503	5,414,126
1768	2,162,324	3,446,908	1806	5,033,351	-	1843	7,146,314	5,417,863
1769	2,176,356	-	1807	5,127,424	-	1844	7,148,957	5,420,262
1770	2,191,139	-	1808	5,222,175	-	1845	7,220,852	5,422,854
1771	2,207,650	-	1809	5,313,194	-	1846	7,254,135	5,424,842
1772	2,224,234	-	1810	5,405,710	-	1847	7,283,050	5,427,373
1773	2,239,586	3,481,657	1811	5,488,658	-	1848	7,312,722	5,429,485
1774	2,255,666	3,485,919	1812	5,561,320	5,288,219	1849	7,342,178	5,431,859
1775	3,083,499	3,738,964	1813	5,628,960	5,291,294	1850	7,375,503	5,433,932
1776	3,102,948	5,003,177	1814	5,691,484	-			
1777	3,125,069	5,013,908[b]	1815	5,752,306	-			

[a] Yunnan TZ (1835 ed.), 55.13a-19b; Yunnan TZ (1898 ed.), 55.13a-19b. See also the following "Minshu gushu zouzhe" (Memorials on population and grain supply), ZP and LFZZ, NZBJ Record Group, dated QL12/12/20 (1747); QL40/12/11 (1775); QL41/10/4 (1776); QL42/11/29 (1777); 49/12/8 (1784); QL50/12/7 (1785); QL51/11/27 (1786); QL57/12/16 (1792) from the Number One Historical Archives in Beijing and QL16/12/7 (1751) GZD 000917; QL17/12/11 (1752) GZD 003117; QL18/12/20 (1753) GZD 005463; QL19/12/11 (1754) GZD 008272; QL28/11/27(1763) GZD 016441; QL29/11/12 (1764) GZD 019069; QL30/12/11 (1765) GZD 021990; QL32/11/11 (1767) GZD 023308; QL33/11/6 (1768) GZD 026346; QL38/11/4 (1773) GZD 026976; QL 42/10/20 (1777) GZD 032891; QL43/10/28 (1778) GZD 036590; QL44/9/15 (1779) JJCD 25200; QL46/11/7 (1781) GZD 039740; QL47/10/28 (1782) GZD 042900; QL48/11/7 (1783) GZD 046313; QL51/10/18 (1786) GZD 049165 from the Palace Archives in Taibei. I would like to thank Sylvie Pasquet and Pierre-Etienne Will for making the Taibei material available to me.

[b] "Minshu gushu zouzhe," ZP, NZBJ Record Group, dated QL6/11/23 (1741); QL7/11/24 (1742); QL10/11/25 (1745); QL12/12/20 (1747); QL15/11/24 (1750); QL25/11/15 (1760); QL40/12/11 (1775); QL41/11/5 (1776); QL44/11/20 (1779); QL49/12/11 (1784); QL50/12/14 (1785); QL51/12/6 (1786); QL52/11/4 (1787); QL57/12/18 (1792) in the Number One Historical Archives in Beijing and QL16/11/11 (1751) GZD 000736; QL 18/12/4 (1753) GZD 005276; QL19/12/5 (1754) GZD 008227; QL20/11/15 (1755) GZD 010773; QL21/11/12 (1756) GZD 013335; QL28/11/29 (1763) GZD 016454; QL29/11/22 (1764) GZD 01959; QL30/11/21 (1765) GZD 0291919; QL32/11/15 (1767) GZD 023047; QL33/11/12 (1768) GZD 026415; QL42/11/10 (1777) GZD 033140; QL43/11/15 (1778) GZD 036789; QL 46/11/21 (1781) GZD 039956; QL47/11/11 (1782) GZD 043089; QL 48/11/10 (1783) GZD 046383 from the Palace Archives in Taibei. Again I would like to thank Sylvie Pasquet and Pierre-Etienne Will for making this material available to me.

[c] Quanguo minshu gushu qingce (National registers on population and grain supply), HC Record Group, wen 497, 965-1006, Number One Historical Archives, Beijing covers the years 1787-91, 1794-5, 1819-20, 1831-50. These registers are reprinted in Li Wenzhi (1955), pp. 7-17 and Yan Zhongping et al, (1955), pp. 362-374. The Number One Historical Archives also has uncatalogued registers for the years 1813, 1816-17, 1821-24, 1826-30.

Table 4

Registered Population of Southern Sichuan, 1750-1850[a]

Year	Households	People	Year	Households	People
1750[b]	-	100,000	1829	312,894	1,620,925
1796[b]	145,497	835,558	1844	409,939	2,131,958
1814[b]	-	915,535	1845	416,384	2,162,506
1821	261,107	1,343,278	1846	422,829	2,201,054
1822	267,573	1,377,973	1847	429,273	2,234,608
1823[c]	-	1,466,273	1848	435,717	2,267,342
1827	299,932	1,551,465	1849	442,161	2,301,701
1828	306,410	1,586,193	1850	448,544	2,311,770

[a] Unless otherwise noted these population figures come from the following unaccessioned Sichuan sheng minshu qingce (Registers on the Population of Sichuan Province), JJCC Record Group, unaccessioned registers dated DG2 (1822); DG8 (1828); DG9 (1829); DG25 (1845); DG27 (1847); DG28 (1848); DG30 (1850), Number One Historical Archives, Beijing.

[b] Qiongxi yelu (Daoguang ed.), 29.2b-3a. The 1814 figure is also recorded in Sichuan TZ (1816 ed.), 65.14a-17a.

[c] Da Qing yitong zhi (Daoguang ed.), 400.9b. Comparison with the Quanguo minshu gushu qingce (National registers on population and grain supply), HC Record Group, unaccessioned register from DG3 (1823) in the Number One Historical Archives in Beijing reveals that the Sichuan population figures recorded in this "1820" edition of the Da Qing yitong zhi are from 1823. This well-known "Jiaqing" administrative geography of China, in other words, is actually from the Daoguang period.

Note: During the Qing the Sichuan portion of the southwest included Ningyuan Prefecture and two Subprefectures from Shuzhou Prefecture (Mabian and Leibo, including Huanglang). Although the data in Table 4 includes only the population under regular central control, the population data reported from Ningyuan sometimes include the population under the native jurisdiction as well. According to Qiuxi yelu (Daoguang ed.), 29.2b-3a, in 1796 there were 90,164 households under non-Han jurisdiction in addition to the 145,497 households recorded. If we assume an average household size of 5 members (the average registered household in southern Sichuan), the total population was probably well over 1 million. Similarly, in 1814 when the total household figures were 315,638, the total registered population was probably well over 1.5 million.

Table 5

Components of "Native" Population Registration in Yunnan, 1775

Prefecture	Previously Counted	Newly Counted	New Increase	% of 1774	Estimated Deaths	% of 1774	Total
Chengjiang	166,570	127,880	1,340	0.8	(884)	(0.5)	294,906
Chuxiong	108,316	88,210	3,503	3.2	(3,367)	(3.1)	196,662
Dali	233,986	121,876	4,138	1.8	(2,472)	(1.1)	357,528
Dongchuan	-	-	-	-	-	-	-
Guangnan	-	-	-	-	-	-	-
Guangxi	77,558	247	258	0.3	(403)	(0.5)	77,660
Jingdong	10,758	13,365	326	3.0	(76)	(0.7)	24,373
Kaihua	39,507	98,535	260	0.7	(148)	-	138,154
Lijiang	120,317	58,531	886	0.7	(489)	-	179,245
Linan	135,030	98,786	3,417	2.5	(2,123)	(1.6)	235,110
Menghua	47,731	38,192	1,733	3.6	(0)	-	87,656
Puer	-	-	-	-	-	-	-
Qujing	338,146	52,428	6,895	2.0	(4,706)	(1.4)	392,763
Wuding	50,688	21,584	554	1.1	(236)	(0.5)	72,590
Xunning	40,760	27,782	712	1.7	(524)	(1.3)	68,730
Yongbei	11,713	24,889	322	2.7	(244)	(2.1)	36,669
Yongchang	325,027	24,680	2,619	0.8	(2,026)	(0.6)	350,300
Yuanjiang	-	-	-	-	-	-	-
Yunnan	549,559	8,913	15,023	2.7	(5,100)	(0.9)	568,395
Zhaotong	-	-	-	-	-	-	-
Zhenyuan	-	-	-	-	-	-	-
Total	**2,255,666**	**805,898**	**41,986**		**(22,798)**		**3,080,741**

Source: Yunnan TZ (1835 ed.), 55.19a-56.46b; Yunnan TZ (1898 ed.), 55.19a-56.46b.

Note: By "newly counted," I mean the population called qingchu. By "new increase," I mean the population called xinzeng. Since these people are all "native-born," "new increase" should mean births. I calculated "estimated deaths" by subtracting the sum of the "previously counted," "newly counted," and "new increase" from the 1775 total. Of course, deaths may include departures. Natives may include immigrants.

Table 6

Yunnan Population Density (people per square kilometer), 1775-1825[a]

Prefecture	1775	1795	1805	1815	1825
Chengjiang	65	82	106	121	129
Chuxiong	10	13	18	23	27
Dali	26	38	46	52	57
Dongchuan[b]	16	-	-	-	42
Guangnan[c]	4	-	-	-	26
Guangxi	6	7	8	10	11
Jingdong	4	5	7	9	10
Kaihua	11	12	13	14	15
Lijiang	5	6	7	8	9
Linan	9	14	16	19	20
Menghua	21	25	31	36	37
Puer[d]	-	5	-	-	-
Qujing	18	20	22	25	28
Tengyue	9	10	11	13	13
Wuding	10	14	19	26	28
Xunning	2	3	3	4	4
Yongbei	3	5	6	7	8
Yongning	7	8	9	10	10
Yuanjiang[e]	7	-	-	-	12
Yunnan	62	85	110	133	152
Zhaotong[b]	16	-	-	-	24
Zhenyuan	12	-	-	-	-

Sources: [a] Yunnan TZ (1835 ed.), 55.19a-56.46b; Yunnan TZ (1898 ed.), 55.19a-56.46b.

[b] This estimate is based on the 4 million catties of salt consumed by these two prefectures in 1763 as recorded in Yunnan TZ (1894 ed.), 72.66b. I assume an annual per capita consumption of 13 catties.

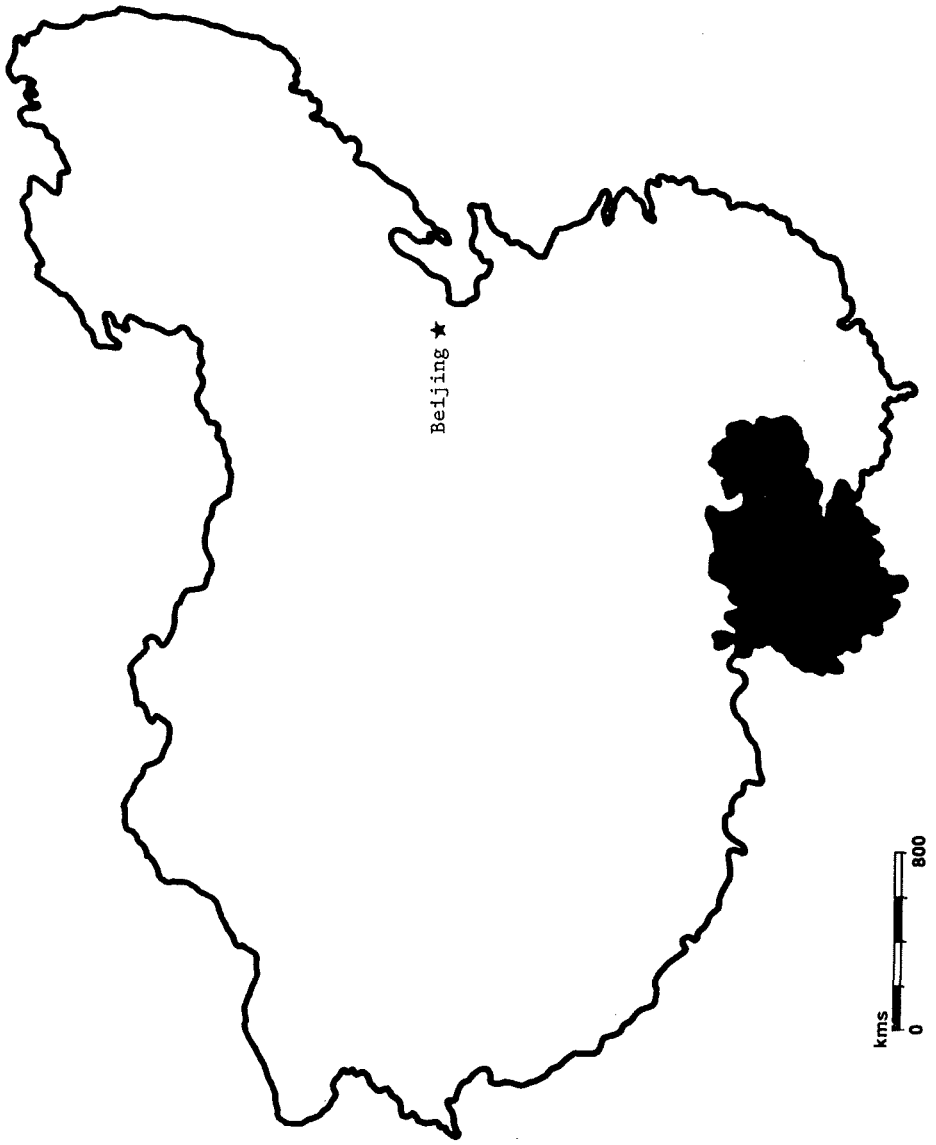
[c] The estimate for 1775 is also based on salt consumption data recorded in Yunnan TZ (1894 ed.), 72.68b-69a. The estimate for 1825 is based on the 67,000 households (calculated at five members per household) registered in Guangnan Prefecture in 1821 and 1823. See Guangnan FZ (1825/1848 ed.), 2.1b, and Weiyuan tingzhi (1837 ed.), 4.49b.

[d] Puer FZ (1850 ed.), 7.1b-2b.

[e] Yuanjiang zhigao (1922 ed.), 6.2b.

Map 1

SOUTHWEST CHINA IN 1800



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Map 2

PREFECTURAL CAPITALS OF SOUTHWEST CHINA IN 1800

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Map 3

YUNNAN PROVINCE: REGISTERED POPULATION 1775

Map 4

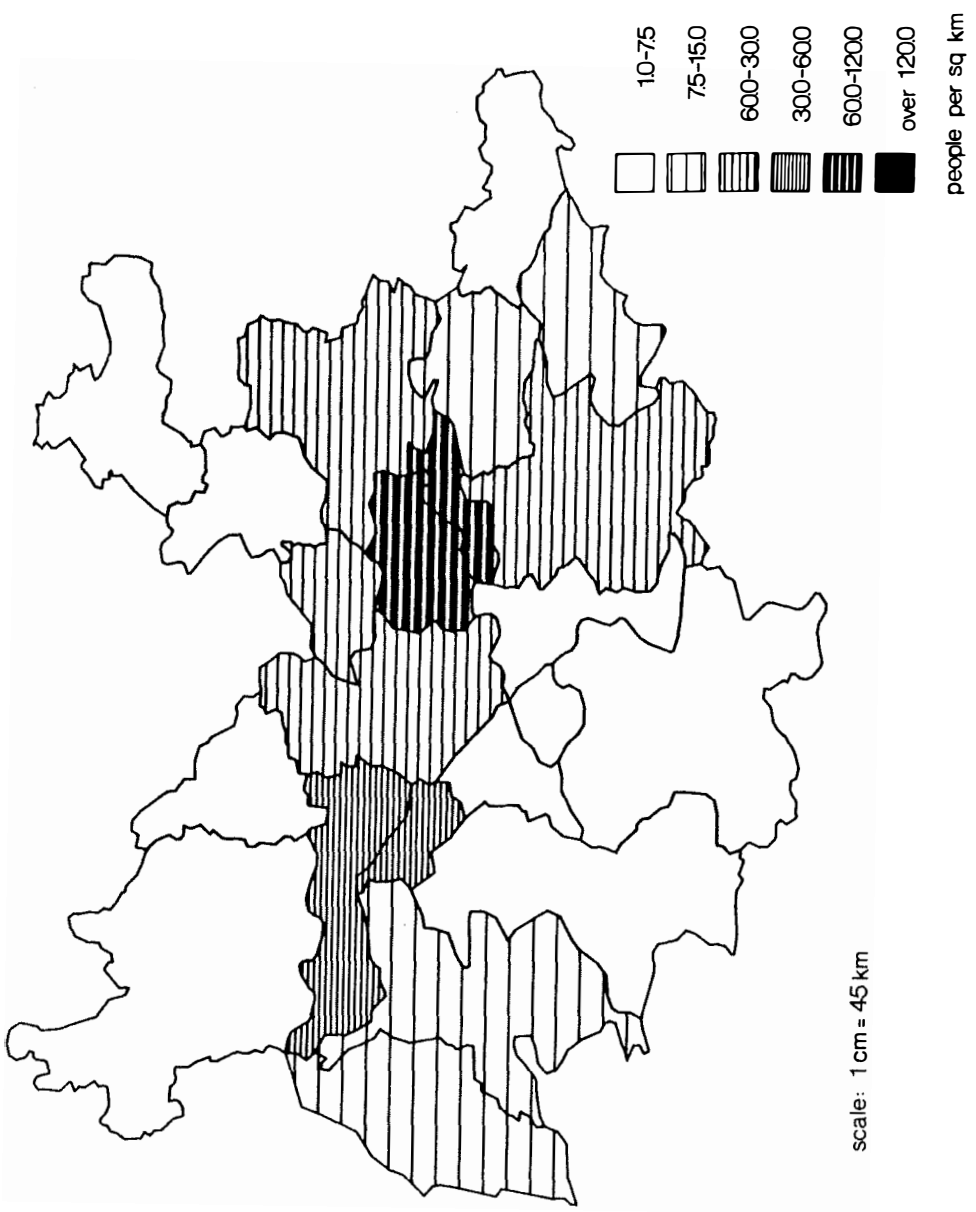
YUNNAN POPULATION DENSITY: 1775

Map 5

YUNNAN POPULATION DENSITY: 1795

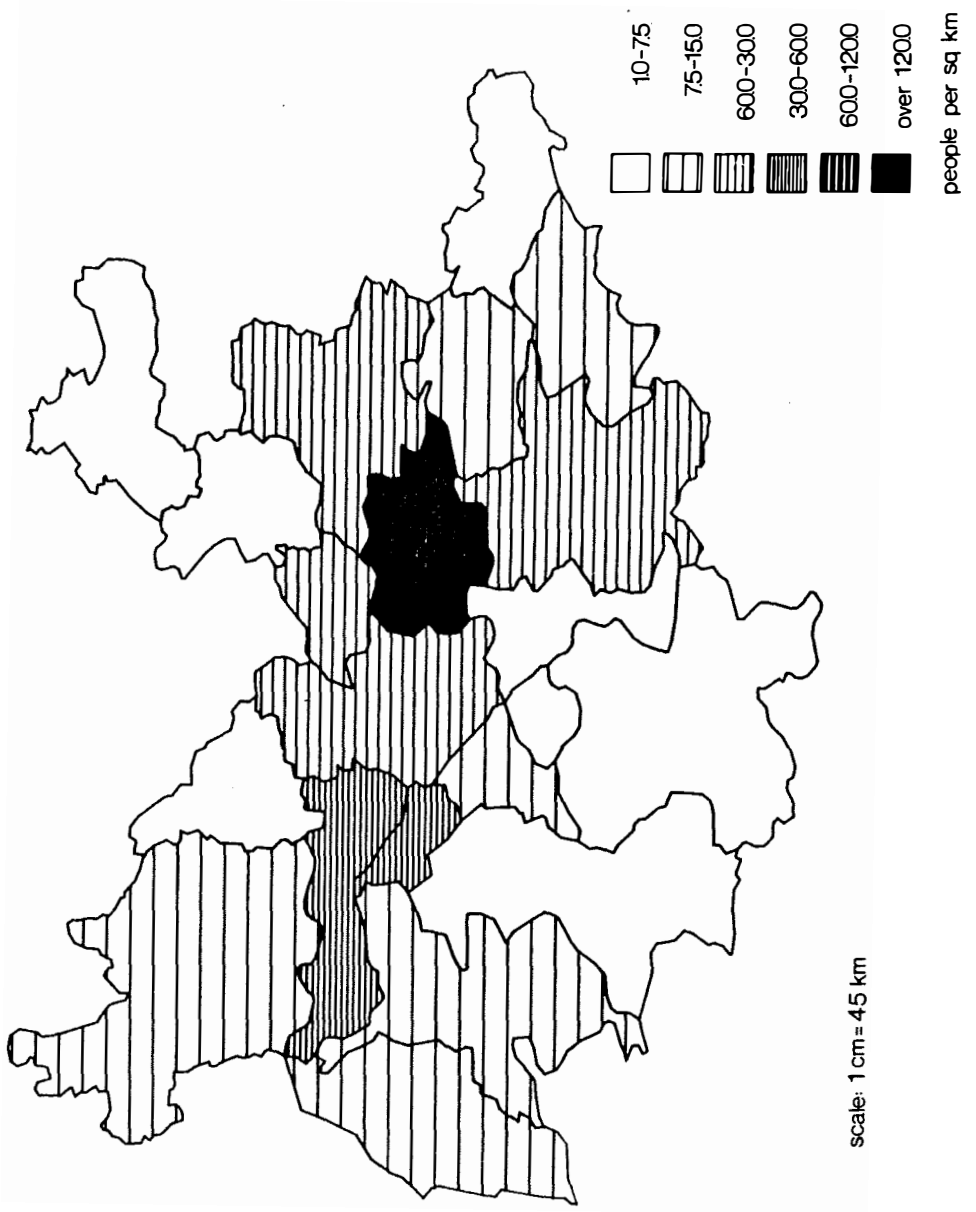
Map 6

YUNNAN POPULATION DENSITY: 1805



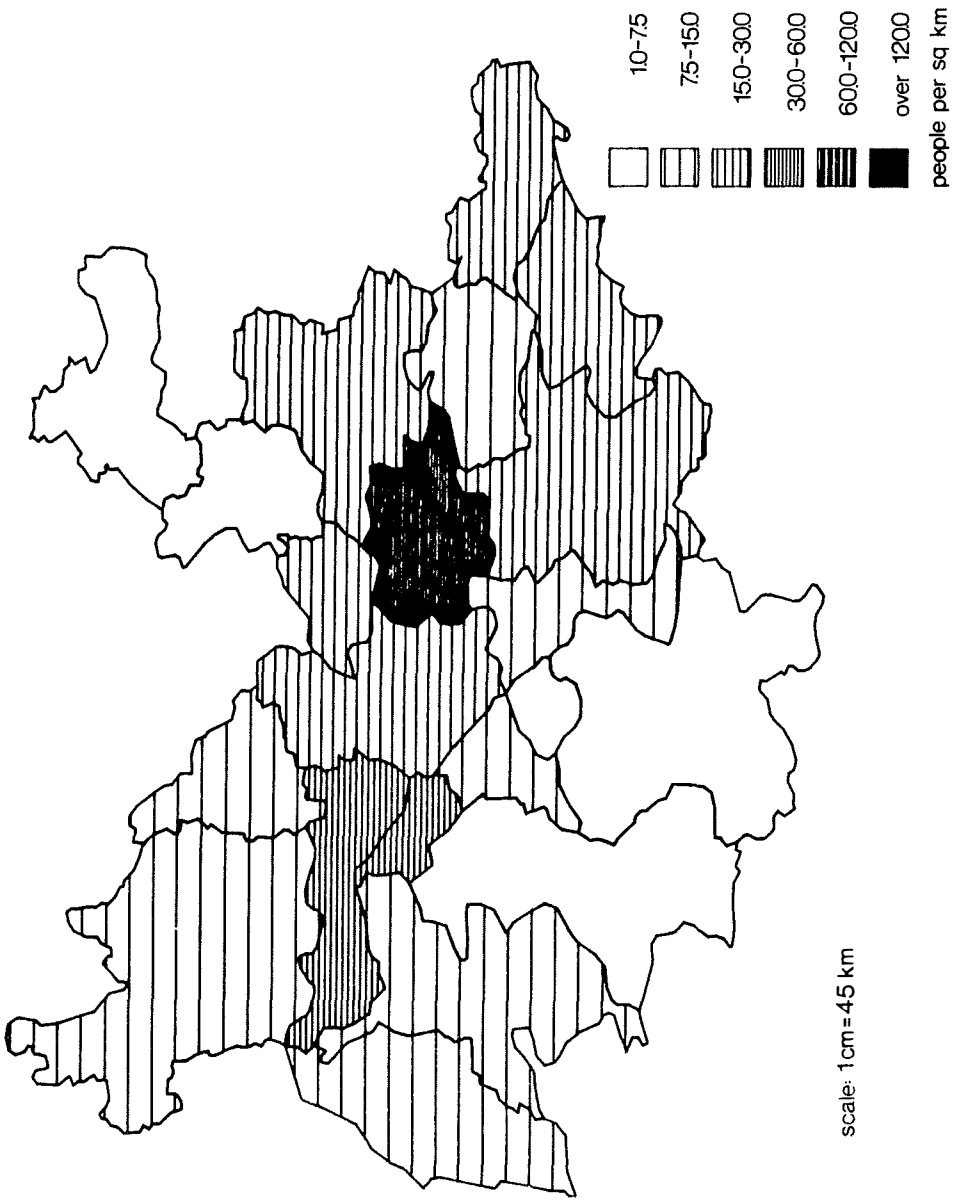
Map 7

YUNNAN POPULATION DENSITY: 1815



Map 8

YUNNAN POPULATION DENSITY: 1825



Map 9

NUTRITIONAL DENSITY IN YUNNAN, 1825

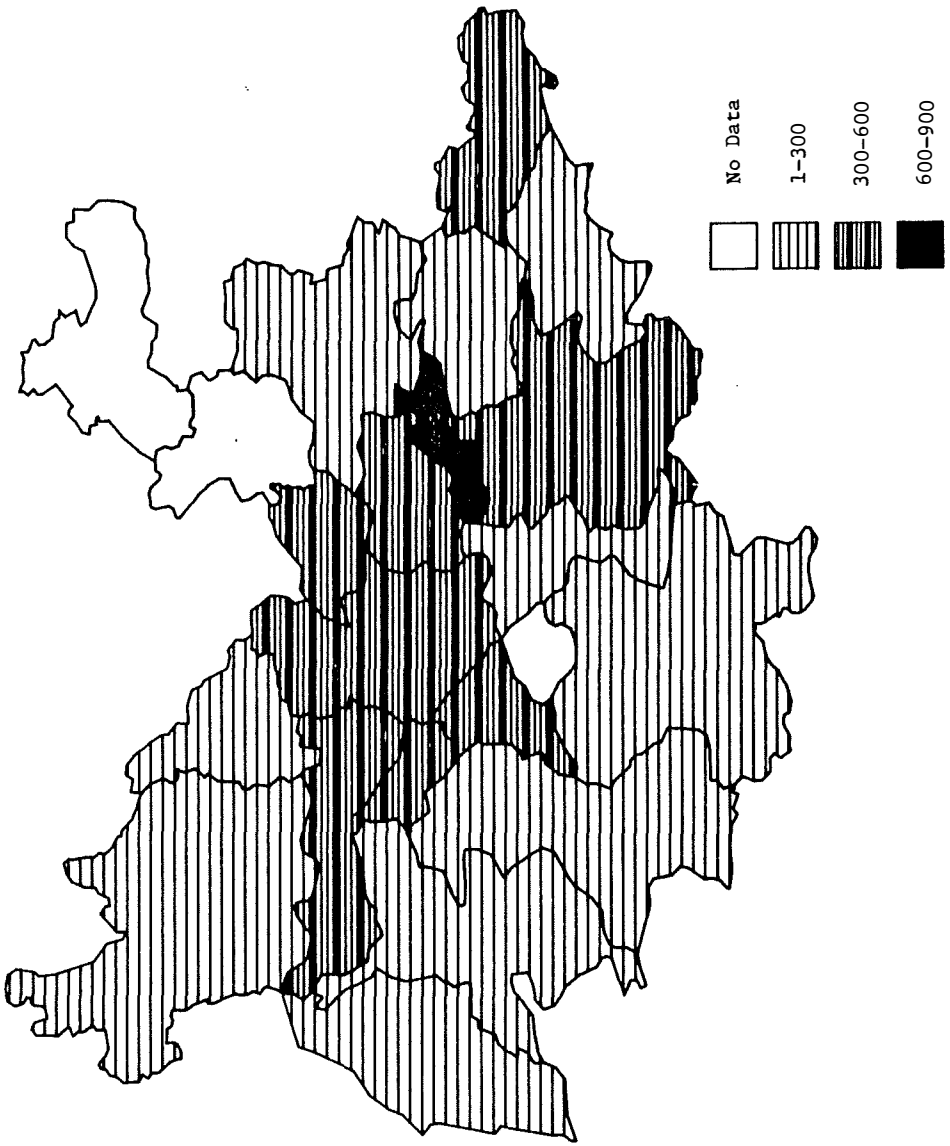


Figure 1

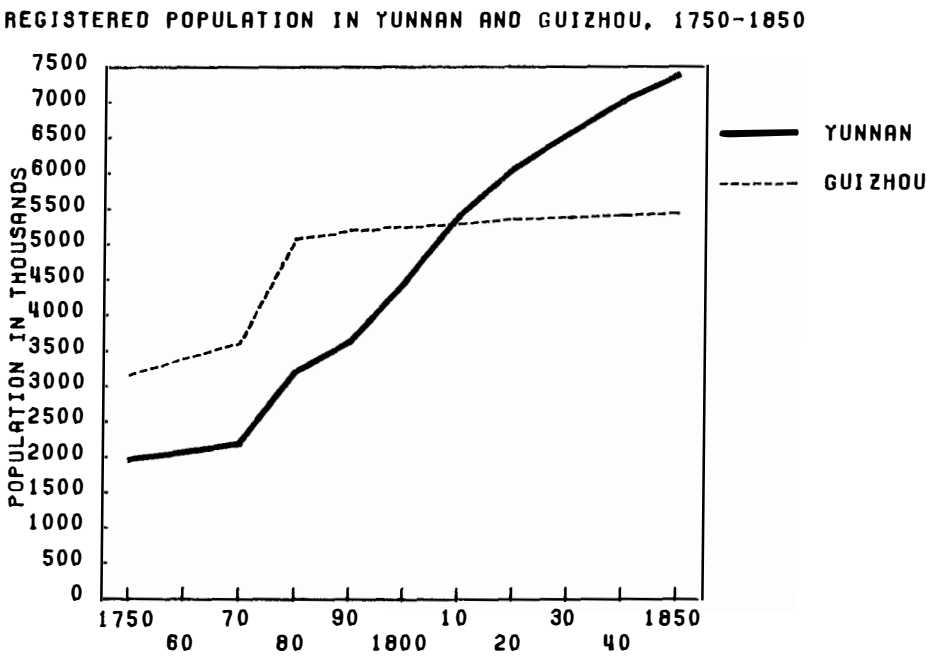
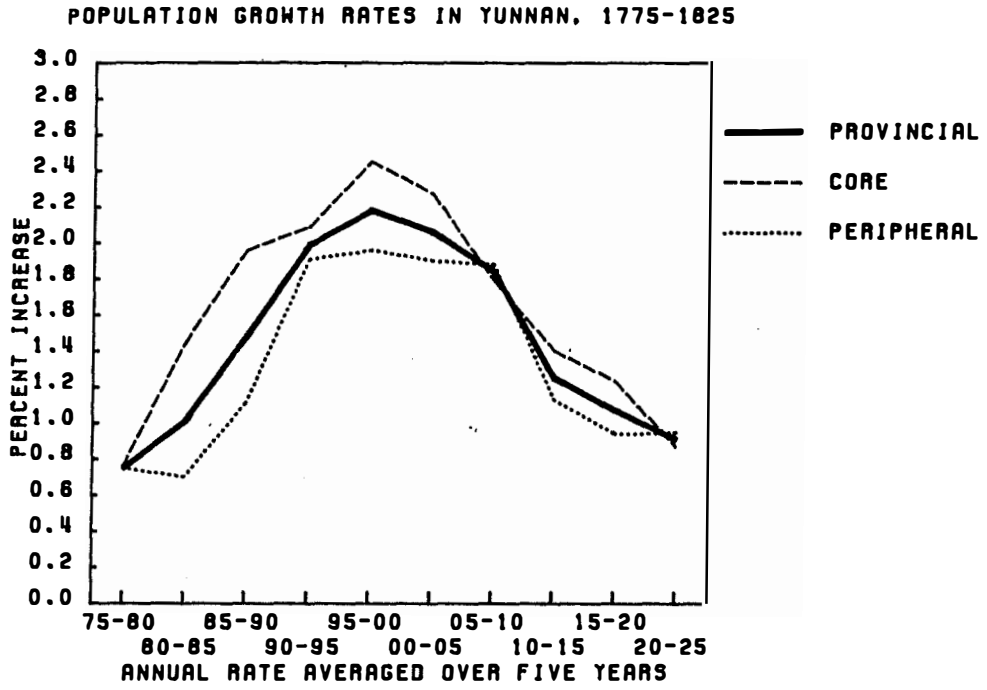


Figure 2



ABBREVIATIONS

FZ	Fuzhi (Prefectural local history)
GZD	Gongzhong dang (Palace Archives: Taibei)
HC	Huangce (Yellow Register)
JJCD	Junjichu dang (Grand Council Archives: Taibei)
LFZZ	Lufu zhouzhe (Grand Council copy of a memorial)
MS	Mingshi (History of the Ming Dynasty)
NZBJ	Neizheng baojing (Domestic affairs: internal security)
SSZX	Sixiang zhanxian (The battleline of thought)
TZ	Tongzhi (Provincial local history)
XZ	Xianzhi (County local history)
ZZ	Zhouzhi (Commandery local history)
ZPZZ	Zhupi zhouzhe (Vermillion rescript memorial)

END NOTES

[1] By southwest China I mean the present-day provinces of Yunnan and Guizhou, as well as Xichang Prefecture and the Liangshan Semiautonomous Yi Region of Sichuan Province. My area, therefore, is only slightly larger than what G. William Skinner 1977, p. 215, has called the "Yungui macroregion."

[2] Fan Ye (398-445), Hou Han shu (Standard history of the Later Han) (Beijing: Zhonghua, 1970), 23.3510-15. In the second century A.D. southwest China included the Dependent State of Qianwei as well as Zangke, Yuesui, Yizhou, and Yongchang Commanderies. According to Zhu 1980, the registered population of Yongchang Commandery may be inflated.

[3] Cheng Wenhai (1249-1318), Chuguo wenxiangong xuelou Cheng xiansheng wenji (Collected works of Cheng Wenhai) (1388 ed.), 5.1a-3a; Guizhou TZ (1741 ed.), 11.2a. The population units listed in this book are "households" (hu). But this appears to be a typographical error. The inscription still exists in Yunnan and gives the population as "people" (kou). I would like to thank Yang Lien-sheng of Harvard University and Yang Xiangkui of the Chinese Academy of Social Sciences for their help in deciphering this text.

[4] According to Guizhou TZ (1741 ed.), 11.2a the numbers are grossly inflated. Yunnan TZ (1576 ed.), 9.8b, and Yuanshi 10.200, 15.321, 61.1470, 63.1539 also give a number of population estimates for the southwest. But these numbers were all reported by victorious generals or local native officials, who had reasons to claim a large subject native population. They were not verified by the central government.

[5] Guizhou TZ (1741 ed.), p.n.a.

[6] The governor of Guizhou, for example, reported in 1555: "There is no way I can find out the complete size of the provincial population. Not only are there no statistics for most non-Han, even the army registers for military households are incomplete. Moreover, many of the immigrants from Sichuan and Jiangxi refuse to recognize our jurisdiction and avoid registration." Guizhou TZ (1555 ed.), 3.47a. For a very similar sixteenth-century comment, see Zhang Huang (1527-1608), Tushu bian (A general encyclopedia) (1613 ed.), 42.35b.

[7] Heyang XZ (1717 ed.), 6.16a records that the population of that county during the sixteenth century was 9,217 men (77%) to 2,726 women (23%), an implausibly high male/female ratio of 3.4 to 1. Zhaozhou Z (1587 ed.), 2.6b records a population figure for that year which is equally implausible: 17,259 men (64%) to 9,764 women (36%), a sex ratio of 1.77 to 1. For similar examples, see Xundian FZ (1550/1963 ed.), 1.8a, and Chengjiang FZ (1717 ed.), 7.42b-43a. I should point out that according to Ming law, all government immigrants had to marry before they moved to the southwest. The unfortunate bachelors who could not find a wife were assigned one from the female criminal population. See Ming huidian 155.1a. The lopsided male/female ratio is, therefore, not a product of immigration.

[8] For a list of these semi-autonomous native leaders from the county level on up, see Lee 1982a appendix M. Jiang 1958 describes these offices in some detail. Instead of corvee the natives paid a set tax called chaifa. See Zhang Xueyan (1553 js.), Wanli kuaiji lu (Government accounts of the Wanli period) (1582 ed.), 13.1a.

[9] In Lee 1982a Appendix E I calculate that Yunnan, for example, had over 10 million mu of cultivated land in 1605. Since per capita acreage was probably four or five mu, this corroborates an estimated population of 2 million.

[10] I have reconstructed the prefectural "population" figures of Yunnan Province in 1455, 1576, and 1625, and of Guizhou Province in 1502, 1555, 1597 and 1625. See Lee 1982a. See, too, Yunnan TZ (1553 ed.), 2.6b-13.10a; Yunnan TZ (1576 ed.), 6.1a-31a; and Dianzhi (1625 ed.), 6.23a-73a; Guizhou TZ (1502 ed.), p.n.a.; Guizhou TZ (1555 ed.), p.n.a.; Guizhou TZ (1597 ed.), p.n.a.; and Qianji (1625 ed.), p.n.a.

[11] Xundian FZ (1550/1963 ed.), 1.5b-7a.

[12] Zhaozhou Z (1587 ed.), p.n.a.

[13] Puan ZZ (1549/1961 ed.), 1.29a-30a; Xundian FZ (1550/1963 ed.), 1.5b-7a; Mahu FZ (1555 ed.), unpaginated.

[14] The major collection of inscriptions from southwest China is in the Yunnan Provincial Museum in Kunming. I would like to thank the museum for allowing me to copy the material I cite here.

[15] Caoxisi changzhu bei (An inscription of the permanently owned lands of the Caoxi Temple), 1694 (Kunming, Yunnan Provincial Museum rubbing).

[16] Puning zang (The Puning sutra), Dali City Library. This important document is described in Wang Yeqiu 1960. I would like to thank the Dali City Library for making a copy available to me.

[17] Faming si zhi changzhutian bei (An inscription of the permanent lands owned by the Faming Temple), 1376 (Kunming, Yunnan Provincial Museum rubbing).

[18] The best general geography of Yunnan is Yunnan dili gaikuang (1978). Although archeological research on Yunnan has only just begun, a sizable introductory literature already exists. On tools, see Wang Dadao 1977; Li Kunsheng 1977, and Li Kunsheng 1979. On irrigation, see Fang Guoyu 1979. On food crops, see Wang Ningsheng 1979.

[19] The Upper Yangzi as defined in Skinner 1979, p. 215, consists largely of Sichuan province. Between 1775 and 1850 alone, the registered population of Sichuan increased sixfold from over 7 million to 44 million. These registered population figures, however, are notoriously suspect. Smaller territorial units elsewhere, of course, also grew at an extremely rapid pace. Taiwan, a prefecture of Fujian Province during the Qing, is perhaps the best-known example (Hsu Wen-hsiung 1975).

[20] Ho 1959, pp. 24-35. See also Li Hua 1979. According to Wang Qingyun (1798-1862), Shiqu yuji (An account of Qing finances and government institutions) (Zhonghua wenshi congshu ed.), the ding tax was merged with the land tax in Yunnan in 1726 and in Guizhou in 1777. In actuality, the dates of this transition varied from area to area. In Yunnan, for example, the transition occurred as early as 1622 in Nanning County, while in Pingyuan Commandary the transition did not occur until 1747. See Nanning XZ (1852 ed.), 4.1a (1622), and Pingyuan ZZ (1848 ed.), 6.2a-b (1747). See also Yuanmou XZ (1712 ed.), 2.29b; Yuanmou XZ (1781 ed.), 5.1a; Kaihua FZ (1758 ed.), 4.6b; Yiliang XZ (1767 ed.), 2.62a; and Sizhou FZ (1722 ed.), 8A.50a-51a.

[21] Only a few genuine population returns survive for southwest China from the seventeenth century. They apparently derive from early attempts at baojia registration. Many more enumerations remain from the early eighteenth century (pre-1740). See Liangwan XZ (1690 ed.), 3.1b; Chengjiang FZ (1717 ed.), 7.42b-43a; Xundian ZZ (1720 ed.), 3.12a; Nanning XZ (1852 ed.), 4.1a; Yuanmou XZ (1698/1712 ed.), 2.29b; Xinping XZ (1712 ed.), 2.14a; Jinning ZZ (1716 ed.), 1.9a; Yunnan XZ (1716 ed.), 1.23a; Chuxiong FZ (1716 ed.), 3.27a; Xie XZ (1717 ed.), 2.21b; Malong ZZ (1723 ed.), 5.2b; Zhenxiong ZZ (1784 ed.), 3.17a; Anning XZ (1949 ed.), unpaginated.

[22] Yunnan TZ (1835 ed.), 55.11b.

[23] Yunnan TZ (1835 ed.), 55.12a. The recorded population figures accordingly increase that year from 971,085 to 1,946,173.

[24] Yunnan TZ (1835 ed.), 55.12a. The figures do not, however, show any unusual increase in 1756. I believe that this may be because many non-Han were in fact already included in the baojia registration. See the pre-1756 examples in Luliang ZZ (1752 ed.), 2.18b, and Zhenxiong ZZ (1784), 3.17a, 6.8b-21b.

[25] According to Ho 1959, pp. 38-53, although immigrants were registered in baojia from 1740 onwards, they were not reported in the population returns in order to avoid double-counting until 1775. In the southwest, however, many immigrants were actually included in the census enumeration. According to Zhang Guangsi, governor of Guizhou, for example, the population report of 1746 included "the immigrant Han Chinese who have settled in Guizhou for some time, bought land, established families, and become 'native,' as well as the acculturated (shu) Miao, who pay taxes along with the Han." See Zhang Guangsi, "Minshu gushu zouzhe," ZP, Record Group 4, Box 1864, Document 6, Number One Historical Archives, Beijing. There are many similar examples in the "Minshu gushu zouzhe" cited in the notes to Table 3.

[26] According to Baiyan Jingzhi (1758 ed.), 1.25a, the local authorities did not organize the population into baojia until 1757. Similarly, according to the Tengyue Tingzhi (1857 ed.), 3.3a-b, the local authorities did not organize the population into baojia until 1760.

[27] Exemption from population registration was mainly a function of territory; not, as has been thought, of ethnicity. Non-Han in areas under control of the central government were included in the reported population. For a concrete example, see Zhenxiong ZZ (1784 ed.), 1.49a. Correspondingly, Han who lived within native jurisdiction were almost always excluded from the regularly reported population. See Qiannan shilue (1749/1847 ed.), 1.10a, 4.1a; Sichuan TZ (1816 ed.), 65.17a-20a; Weiyuan tingzhi (1837 ed.), 3.49a-54a.

[28] Qianlong sanshiyi nian Yunnan sheng shengshi zisheng hukou yong bu jiafu rending zongshu wence (The population registration for Yunnan Province in 1766), wen 416, Number One Historical Archives, Beijing. Evidently the population in these areas lived under native jurisdiction.

[29] In 1711 the Qing froze the ding tax. In theory, population registration thereafter had no accompanying responsibilities, only privileges--the right to grain relief.

[30] Xie County, in Linan Prefecture Yunnan Province, is a conspicuous example of under registration. The 1860 ed. of the Xie XZ 8.1b-2a, reports the same population as the 1698/1717 ed., 2.21b, that is just 3,000 men and 3,168 women, 6,168 people. Yet sales figures from the government salt monopoly

suggest that by 1775 the population was already over 26,000. Evidently for over one hundred fifty years there was no new population enumeration in this county. See n. 50.

[31] Dading FZ (1850 ed.), 40.2a, and Zunyi FZ (1841 ed.), 20.1a, for example, state that the Jiaqing and Daoguang reigns (1796-1850) were periods of rapid population growth. The population data in Table 3, however, indicate an annual rate of growth in Guizhou of less than 1 per thousand. In contrast the data for Yunnan indicate an annual rate of growth of over 11 per thousand.

[32] The reported birth and estimated death rates vary, from prefecture to prefecture, by more than an order of magnitude. One prefecture, Menghua, even claimed no deaths!

[33] According to Zhanyi ZZ (1885 ed.), 2.49a, in Yunnan "the poor who have no households of their own are registered under the households of their relatives or under the households of the families with whom they are boarding." Migrant laborers, for example, often registered on the household form of their employer. See Chen Nieheng (f. 1725), Bianzhou wenjian lu (What I saw and heard along the frontier) (1725 preface), 8.13a and Wuding XZ (1689 ed.), 4B.56a-58b.

[34] According to Guangnan FZ (1825 ed.), 2.1b, "In 1821 the prefecture included over 4,500 jia (that is, 45,000 families). But immigrants are hard to keep track of. Many of them are missing from the registers." According to an investigation completed in 1823, the missing immigrants in this single prefecture numbered well over 22,000 households, perhaps as many as 100,000 people. See Weiyuan TZ (1837 ed.), 3.49b.

[35] Yang Xifu, Sizhi tang wenji (Collected essays by Yang Xifu) (1806 ed.), 6.5a, expresses skepticism about all early nineteenth-century population figures for southwest China. The editor of the voluminous Anxun FZ (1851 ed.), 2.1a, even refused to record the registered population in his book because he considered the population records "unreliable." For similar expressions of skepticism, see Qiaojia XZ (1942 ed.), 4.2a, and Tengyue Tingzhi (1887 ed.), 3.1a.

[36] On the many dangers of aggregated Qing population data, even between 1775 and 1850, see Lee (forthcoming). Unfortunately, few household registers appear to have survived from the Qing in either Yunnan or Guizhou provinces. Indeed, the only registers I have found are Lijiang Fu Jianchuan Zhou Xixiang zhong huji ce (The household registers for the West District of Jianchuan Commandary in Lijiang Prefecture) (1850-51 manuscript copy). For an analysis of these registers and a transcript of their contents, see Lee 1982a, Appendix D. I would like to thank Chen Baiqan of the Yunnan Provincial Library for introducing these documents to me.

[37] Zhang Hong (ca. 1745), Dinnan xinyu (A new account of Yunnan) (Congshu jicheng ed.), 1.19, records that in 1740 the population of Yunnan already consumed over 36 million catties (jin) of salt a year. Since according to Chiang Tao-chang 1975, p. 151, annual salt consumption in Yunnan was 13 catties per capita this means a population of three million or so, three times the registered population!

[38] See Qiannan shilue (1749/1847 ed.), 1.10a, 4.1a; Sichuan TZ (1816 ed.), 65.17a-20a; Weiyuan tingzhi (1837 ed.), 3.49a-54a. I discuss these special immigrant registrations in Lee 1981b.

[39] According to Dongchuan ZZ (1761 ed.), 8.14b-15a, by the mid-eighteenth century there were already well over one hundred thousand recent immigrant farmers in Dongchuan alone. Elsewhere I estimate that by the early nineteenth century there were several hundred thousand miners in northeast Yunnan.

[40] According to Xie XZ (1717 ed.), 2.27a, "Although the state does not register the population within the non-Han territories, we make our own estimates of the number of people in order to determine the demand for salt." These estimates, however, are most useful for the period between 1675 and 1775. By the late eighteenth century, the salt monopoly could not keep up with population growth. I summarize the data for Yunnan Province in Lee 1982a, Appendix C. I have found no figures on salt consumption for Guizhou or southern Sichuan and cannot estimate the missing population.

[41] Yunnan TZ (1835 ed.), 55.19a-56.46b; Yunnan TZ (1898), 55.19a-56.46b. I summarize these prefectural series in Lee 1981a. There are no subprovincial series of population figures for Guizhou and southern Sichuan comparable in detail and dependability. For the moment, therefore, we must depend on the scattered numbers available in subprovincial local histories. The most detailed I know of are Dading FZ (1850 ed.) and Guiyang FZ (1850 ed.) for Guizhou Province and Qiongxi yelu (1832 ed.) and Leibo tingzhi (1893 ed.) for southern Sichuan.

[42] The provincial and prefectural boundaries of these maps are derived from Tan Qixiang 1975, pp. 25-26, which purports to depict the boundaries as they were ca. 1820. I would like to thank Professor Tan for permission to use his maps. Liang Fangzhong has also calculated the population density of Yunnan, by prefecture, for 1820, with data derived from the Da Qing yitong zhi (A comprehensive geography of the Qing) ("1820" ed.), in Liang Fangzhong 1980, pp. 273-79. But he uses a modern map to divide the historic population. His results are hopelessly skewed on two counts. First, the population figures recorded for Yunnan Province in this general gazetteer do not include the tunhu, or about one-third of the registered provincial population. Second, the geographical boundaries in Yunnan have changed radically since the Qing. All the prefectural boundaries, for example, have been redrawn. Moreover, over the last century and a half, the total area of Yunnan itself has shrunk from 396,745 square kilometers to 378,300 square kilometers. Liang's results

differ in every case from my calculations. Although I have not examined G. William Skinner's 1979 calculations in detail, I suspect that his map of southwest China is similarly skewed.

[43] In Zhaozhou Commandary, just south of Dali, for example, the number of villages remained roughly stable during the sixteenth and seventeenth centuries, but increased from 35 to 60 villages in the century between the 1730s and 1830s. See Zhaozhou Z (1587 ed.), 1.28b; (1736 ed.), 1.22b-23b; and (1838 ed.), 1.57b-58b. Similarly, in Yiliang County in southern Yunnan, the number of villages rose from 161 in the late eighteenth century to 275 by the late nineteenth century. See Yiliang XZ (1716 ed.), 1.8a-10b; (1767 ed.), 1.47a-49b; (1786 ed.), juan 1; and (1921 ed.), 2.2b-6a. Most spectacularly, in Dayao County in northern Yunnan, the number of villages stayed roughly stable throughout the seventeenth century, only to jump from 150 to 368 between 1742 and 1845. See Dayao XZ (1714 ed.), 1.13a-17a; (1742 ed.), juan 2; (1845 ed.), 3.3b-48b, and (1849 ed.), unpaginated.

[44] I summarize and analyze all available figures on cultivated acreage in Lee 1982a appendix E.

[45] According to the 1827 edition of the local history of Anping County in Guizhou, "Wheat and rice require fertile soil. They need far more labor and far more fertilizer than other crops. In contrast, corn requires little labor and can be planted on high mountains, ridges and cliffs." Anping XZ (1827 ed.), 4.70b-71a.

[46] Dian Qian Zhiiue (Qianlong ed.), 10.1b; Shibing ZZ (1673 ed.), 1.12b.

[47] Dongchuan ZZ (1761 ed.), 18.1b; Yunnan TZ (1835 ed.), 69.37a; Yunnan TZ 1894 ed.), 69.37.

[48] Lee 1982a. The cultivated land acreage figures calculated by Perkins 1969, p. 234 for the southwest as of 1766 are far too low. If Guizhou, for example, had only 3 million cultivated mu in 1766, the nutritional density would be 2,569 people per square kilometer of cultivated land, four times heavier a burden than that of Zhejiang, one of the most developed provinces in China.

[49] Wu Daxun (f. 1790), Diannan wenjianlu (What I saw and heard in Yunnan) (Qianlong ed.), 2.40b.

[50] I analyze the grain trade in Yunnan is some detail in Lee 1982a. My analysis is based in large part on a collection of 107 Jigu ce (Granary account books) from the nineteenth century, preserved in the Yunnan Provincial Archives in Kunming.

[51] Gaozong shilu 4.26a-b, 30a.

[52] This estimate is by Ni Tuo, an early nineteenth-century official in Yunnan who is well-known for his perceptive comments on southwestern society. Dianxi (1817/1887 ed.), 14.22a.

[53] The major contemporary source on Ming government mining labor is He Mengchun (1474-1536), He gongjlan gong bijl (Miscellaneous essays by He Mengchun) (Ming manuscript edition), 4.1a-5a, 6.22b-30a. For a brief modern discussion on the lack of mining labor during the Ming, see Ning Zhao 1962.

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